IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: DAVID HUGHES HORNE

SERIAL NO.: 10/809,989

FILED: March 26, 2004

FOR: PROCESS FOR INCREASING STRENGTH, FLEXIBILITY AND FATIGUE LIFE OF METALS

GROUP ART UNIT: 1765

EXAMINER: ANITA KAREN ALANKO

AFFIDAVIT

STATE OF UTAH)
: ss
COUNTY OF SALT LAKE)

Comes now David Hughes Horne, the inventor of the above-entitled invention for the application identified in Serial No. 10/809,989, and responds as follows:

COMMENTS ON THE APPLICABILITY OF PRIOR ART established by European Patent Application, EP 0 976 795 A2, "Antifriction Coating for Metals and Process for its Manufacture," Clerici, et al. to the USPTO Application, 10/809,989 Horne, Process for Increasing Strength, Flexibility and Fatigue Life of Metals."

1. The USPTO examiner noted the following elements in Clerici, et al.'s specification and claims that appeared to anticipate Horne's claims 1-3: **NOTE:** Comments quoted from the Office Action will be printed in italics to assist in contrasting the USPTO statements with those of the inventor, Horne.

2. The USPTO Office Action states, *"Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Clerici et al. in EP976795 A2.*

"Clerici discloses a method comprising cleaning [0020] – 'hot alkaline cleaner' on steel bolts) and application of an etch ([0020] – pickling by 10% HCl) and surface treatment with a corrosion preventive compound ([0021]-[0023] the 'antifriction coating' which also provides corrosion resistance). Since the method of Clerici is the same as that cited, it is expected to be capable of providing the statements of intended use such as minimizing stress concentration points, minimizing stress intensity factor, and mitigate or prevent crack growth or propagation."

3. COMMENT: No mention on Clerici's specification or claims is made of an etching procedure. The Clerici Specification [0002] states, "Application of antifriction coatings to substrates is often improved by pretreatment of the substrate surface, for example by phosphate coating, fine sandblasting, pickling or anodizing." The American Society for Metals (ASM) Materials Engineering Dictionary, J.R. Davis 1992, defined "pickling" as, "The chemical removal of surface oxides (scale) and other contaminants such as dirt from iron and steel by immersion in an aqueous acid solution (Fig. 375). The most common pickling solutions are sulfuric acid and hydrochloric acid." Thus pickling is not to etch the metal, but in contrast, etching in that dictionary involves metal or ceramic removal.

The purpose in Clerici's specification to use 10% HCl was not to affect the apexes of cracks, gouges, scratches, etc. to cause an increase in strength, flexibility, and fatigue life in contrast with values normally expected of the metal. Clerici's Specification [0020] includes, "Substrates are pretreated prior to coating with an antifriction coating to improve adhesion and life in the antifriction coating. Conventional methods of pretreatment include degreasing (for example, using solvents or steam), treatment of corroded surfaces by acid or alkali, phosphating, oxalic acid treatment of stainless steel, sandblasting and anodizing." Clerici's HCl treatment was to clean it of rust to prepare it for phosphating over which a solid antifriction material is overlaid.

The Ninth Edition Metals Handbook states, "Phosphate coating is the treatment of iron, steel, galvanized steel, or aluminum with a dilute solution of phosphoric acid and other chemicals in which the surface of the metal, reacting chemically with the phosphoric acid media, is converted to an integral, mildly protective layer of insoluble crystalline phosphate."[1]

Phosphating appears to be most valuable as a base material on the mentioned metals over which paint or some other material will adhere. Perhaps that's why the Metals Handbook (quoted above) said the phosphate crystalline layer is only a ". . . mildly protective layer." But there is no hint within the Horne Application of applying a solid antifriction layer after etching.

4. The USPTO examiner noted that the Clerici process included a corrosion preventive compound (CPC), so their use of a CPC on the surface of a part anticipates the use of a CPC. In the corrosion control art a corrosion preventive compound is a liquid that is applied by spraying, brushing, or dipping. Although in Clerici's Specification [0003], [0004], [0005], and Claim 1 require a corrosion inhibitor in their process, the technology of cathodic protection so specified involves a different phenomenon of sacrificial anode material that corrodes in preference to the base metal on which it is electrically attached. Clerici's sacrificial elements are zinc particles, aluminum powder or particles, and a metal phosphate. The Horne technology involves a liquid CPC that has a maximum surface tension of 30-dynes/cm, a wide liquid temperature range to assure a perpetual liquid state, a low vapor pressure to prevent evaporation, and a very low water miscibility. The zinc, aluminum, and metal phosphate do not comply with any of these required parameters [0018]. The cathodic protection materials required by the Clerici patent would fail to do the functions required by Horne technology.

[1] Metals Handbook Ninth Edition, Vol. 5, Pg. 434, American Society of Metals, International, Metals Park, OH

5. None of the processes claimed in the Clerici patent is even remotely similar and for the same purpose of the processes in the Horne Specification or Claims. Also, the art in the Clerici patent involves the use of solids very active on the galvanic table, zinc and aluminum particles, to make a cathodic protection material which is blended with a solid antifriction material. The claims in the Clerici patent and the claims in the Horne Application are sufficiently different to be viewed as mutually exclusive. In fact the use of phosphating before application of an antifriction material as described in the Clerici patent has been in use for a long time but has not caused others, expert in the art of corrosion or metallurgy, to focus on the root causes of strength, flexibility, and fatigue life impairment. It simply is not obvious and not anticipated by any of the processes mentioned in the Clerici patent. No logic has been found to suggest that the Clerici patent processes would anticipate the processes in Horne's Application claims.

6. The Clerici patent does not anticipate the use of an etch at all for any purpose. The Horne art provides a totally new purpose for an etch although the etching process may be ancient. Also, the Horne art requires an additional application of a corrosion preventive compound (CPC) process that provides a synergistic effect of the etching of the tips of cracks and the small radii of scratches, gouges, machine cuts, and etc. for the mentioned metal properties enhancement, the excellence of the Horne art is to combine the effects of the etch synergistically with a means to prevent or mitigate corrosion failure of the metal to metal bonds with an excellent CPC at the post-etch reduced stress intensity factor locations. This synergism is a significant improvement on the present art. Testing has shown not only both treatments are necessary to achieve the maximum possible benefits that the synergism produces, an art with spectacular results.

David H. Horne, Chemical Engineer
Registered Professional Engineer

David Hughes Horne

Subscribed and sworn to before me this 26th day of May, 2006.

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